



78.1966.1 Birthplace John Shaw Billings M.D.,
April 12, 1836- March 11, 1913
Switzerland County
Marker Text Review Report
08/14/2014

Marker Text

His was "*The most important contribution yet made to American medicine.*" Civil War surgeon, pioneer planner of modern hospitals, early advocate of preventive medicine. Billings published the Surgeon-General's first medical Index Catalogue in 1880.

Report

The marker text is accurate; however, IHB now avoids the use of subjective and superlative terms such as "first," "best," and "most." Such claims are often not verifiable and/or require extensive qualification to be truly accurate. The marker statement that Billings's was "*The most important contribution yet made to American medicine*" likely refers to a statement made by Dr. William H. Welch, colleague of Billings at Johns Hopkins University. Welch contended that Billings's development of the Surgeon-General's library and corresponding Index Catalogue "constitutes probably the most original and distinctive contribution to America to the medicine of the world."¹ While the quoted statement cannot be verified, Billings's vast and enduring contributions to medicine are confirmed by the existence of the [New York Public Library](#), [Johns Hopkins Hospital](#), [MEDLINE](#) and [PubMed](#), among many other medical structures and practices.

Billings's accomplishments are so extensive that the marker is unable to represent them comprehensively. Therefore, this review expounds upon the points mentioned in the marker text and provides information about locating source material on those achievements excluded from the marker.

Billings was born April 12, 1838 in Allensville, Indiana.² In 1841, the family moved to various parts of the East Coast, returning to Allensville around 1848.³ At the age of 14, Billings passed the entrance exam for Miami University at Oxford, Ohio, earning his B.A., and in 1858 entered the Medical College of Ohio at Cincinnati.⁴ He graduated with his medical degree in 1860, after completing his thesis "The Surgical Treatment of Epilepsy."⁵ Billings's struggle to obtain sources for his thesis informed his bibliographical work and the composition of the Index Catalogue, expounded upon later in the review.⁶

The [American Civil War](#) commenced shortly after Billings graduated, providing him with opportunities to apply his medical knowledge. In 1861, he traveled to Washington, D.C. and became a contract-surgeon with the military.⁷ He was then appointed assistant surgeon in the U.S. Army, working at the [Union Hospital](#) in Georgetown.⁸ While there, his "extraordinary manual skill and boldness in dealing with difficult cases attracted the attention of the surgeon-general" and he was put in charge of [Cliffburne Hospital](#) near Georgetown.⁹



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08/14/2014

He was then assigned to work with the 11th Infantry, Fifth Corps, establishing a hospital for soldiers in anticipation of the Chancellorsville fight.¹⁰ During the [Battle of Chancellorsville](#), Billings experienced the “terrible problem of moving again and again the wounded of a retreating army,” due to the proximity of the fighting to the field hospital.¹¹ He was later assigned to the Second Division of the Fifth Army Corps, establishing a hospital at Gettysburg.¹² Billings wrote to his wife about the [Battle of Gettysburg](#), lamenting

I am utterly exhausted, mentally and physically. I have been operating night and day, and am still hard at work. I have been left in charge of 700 wounded, and have got my hands full. Our division lost terribly, over 30 per cent were killed and wounded. I had my left ear just touched with a ball . . . I am covered with blood, and am tired out almost completely, and can only say that I could lie down and sleep for sixteen hours without stopping. I have been operating all day long, and have got the chief part of the work done in a satisfactory manner.¹³

Billings also treated soldiers during the Battles of the Wilderness, Cold Harbor and Petersburg.¹⁴ He then transferred to the Surgeon-General’s Office, where he remained until retirement in 1895.¹⁵

As the war concluded, hospitals submitted surplus operating funds to the Surgeon-General’s Office, given to Billings to build up the Surgeon-General’s library, which later became the [National Library of Medicine](#).¹⁶ He recalled the “intense drudgery” of his thesis research, which required him to visit libraries in Cincinnati and Philadelphia, a process that involved intensive labor and time.¹⁷ This experience prompted him to establish a complete medical library for physicians and an accompanying index that “would spare medical teachers and writers the drudgery of consulting ten thousand or more different indexes or of turning over the leaves of as many volumes to find the dozen or so references of which they might be in search.”¹⁸

Billings began work on the index in 1873 and, with the assistance of Dr. Robert Fletcher, published the first volume of the [Surgeon General’s Medical Index Catalogue](#) in 1880.¹⁹ The Index Catalogue served as an invaluable reference tool for medical professionals; Sir William Osler, Oxford University medical professor and friend of Billings, contended that “no undertaking in bibliography of the same magnitude dealing with a special subject had ever been issued, and its extraordinary value was at once appreciated all over the world.”²⁰

As new medical materials were published it became a struggle to keep the Catalogue current, so Billings devised the [Index Medicus](#), a monthly supplement that was “far narrower in scope [than the Catalogue], focusing on new articles from selected journals, selected new books, and theses.”²¹ The *Index Medicus* was the forerunner to the digital medical databases MEDLINE and PubMed.²² Dr. Stephen J. Greenberg and Patricia E. Gallagher summarize Billings’s bibliographical contributions in [“The Great Contribution: Index Medicus, Index-Catalogue, and IndexCat,”](#) contending that “with only ink and index cards, they



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Switzerland County
Marker Text Review Report
08/14/2014

[Billings and Fletcher] tamed an enormous and complex technical literature in virtually every written language on the planet” and that the indices “paved the way for the great databases that now are the primary underpinnings for the medical research of the future.”²³

Billings’s accomplishments extended beyond medical bibliography and into hospital planning, as he became a “leading authority and acquired international reputation” in the construction and organization of hospitals.²⁴ Billings’s interest in hospital design and management began during the Civil War, where he experienced the struggle of treating and transporting large numbers of wounded soldiers.²⁵ Dr. Welch asserted that Billings’s interest “can be traced to his experiences as a surgeon in our Civil war, in the course of which there was developed a new style of building hospitals.”²⁶

Billings’s “novel approach” to hospital administration appealed to the trustees of Johns Hopkins’ fund, who after inviting five medical professionals to [submit plans](#) for the establishment of a hospital, selected Billings’s design in 1876.²⁷ Billings’s revolutionary ideas about medical education and treatment are apparent in his essay to the trustees, and reflect his belief that a hospital should not only treat patients, but educate medical professionals.²⁸ These principles were incorporated into the Johns Hopkins Hospital, opened in 1889, and designed to be a “great laboratory for teaching the practical applications of the laws of hygiene to heating, ventilation, house drainage, and other sanitary matters” and “to increase our knowledge of the causes, symptoms, results, and treatment of disease.”²⁹

The hospital included a training school for nurses, a pathological laboratory for experimental research, and connected to a building with a teaching amphitheatre.³⁰ Dr. Welch summarizes Billings’s colossal impact on hospital planning, stating that the Johns Hopkins Hospital

marked a new era in hospital construction . . . When one considers the influence of this hospital upon the construction of other hospitals and the valuable contributions made by Dr. Billings to the solution of various hospital problems, when one also regards the uses which have been made of this hospital in the care and treatment of the sick, in the training of students and physicians and the promotion of knowledge, it is evident that Dr. Billings’ services in the field we are now considering were of large and enduring significance.³¹

In addition to establishing the Johns Hopkins Hospital, Billings served as director of the [University of Pennsylvania Hospital](#) and taught there as a professor of hygiene.³²

Billings’s hospital design, as well as his publications about sanitation, confirms the marker statement that he was an early advocate of preventative medicine.³³ He taught about the importance of sanitation and hygiene in hospitals, designing them to minimize the spread of disease.³⁴ In his 1893 “The Relations of Hospitals to Public Health,” Billings asserted that the “importance of hospitals for certain forms of



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Switzerland County
Marker Text Review Report
08/14/2014

contagious and infectious disease, as a means of preventing the spread of such diseases, would appear to be almost self-evident, yet very few cities in this country are provided with them.”³⁵ He emphasized the prevention of illness rather than solely its isolation, advocating for the move from “pest houses,” that secluded ill patients, to better medical facilities.³⁶ Billings eliminated corners from the Johns Hopkins Hospital to prevent the buildup of dust and disease and designed it so that visitors and staff had to go outside to travel from one ward to another, ensuring that “foul air, in any forms, cannot spread from one building to another.”³⁷ According to A. McGehee Harvey and Susan L. Abrams, Billings’s emphasis on prevention through hospital design “helped to stimulate the revolution in medical practice” in the late 1880s.³⁸

In addition to advocating for preventative and hygienic measures in hospitals, Billings tried to implement prevention in the public sphere. An 1894 article in *The* (Washington, D.C.) *Evening Star* proclaimed Billings the “foremost authority in this country in municipal hygiene and medical literature.”³⁹ He spearheaded the “national public hygiene movement,” joining the [American Public Health Association](#) in 1872 (becoming president in 1880) to “replace a system of sanitation based on individual opinion and hypothesis with one based on science.”⁴⁰ He also conducted major surveys and statistics to improve sanitary efforts that could impede the spread of disease.⁴¹

The contributions listed on the marker alone are remarkable, but many of Billings’s accomplishments are unmentioned. In 1896 Billings served as the first director of the New York Public Library (serving until his death in 1913), expanding its collections “without parallel.”⁴² Industrialist and philanthropist Andrew Carnegie solicited his help in the establishment of a system of branch libraries in New York City and referred to Billings on various educational matters.⁴³ Additionally, Billings convinced Carnegie to donate millions of dollars to [public libraries](#) throughout the United States.⁴⁴

Billings worked with the U.S. Census from 1880 to 1910 to develop vital statistics. He sought to record census data on cards using a hole punch system, which would allow the data to be counted mechanically.⁴⁵ Herman Hollerith applied Billings’s concept, devising “‘electrical counting and integrating machines’” employed by the U.S. Census.⁴⁶ Information about Billings’s additional accomplishments can be found below, as well as in the National Medical Library’s extensive [John Shaw Billings Bibliography](#).

Billings passed away March 11, 1913 and was buried in the Arlington National Cemetery.⁴⁷ At a meeting to honor Billings, Dr. S. Weir Mitchell commented that Billings possessed “unfailing industry, a love for work, and a singular variety of interests and competencies that enabled him as few other men to classify and co-ordinate all branches of knowledge.”⁴⁸



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Marker Text Review Report
08/14/2014

For Further Information

Dr. Fielding H. Garrison provides access to some of Billings's letters and journal entries in his 1915 [*John Shaw Billings: A Memoir*](#).

For a comprehensive scholarly analysis of Billings's contributions, see Carleton B. Chapman's 1994 *Order Out of Chaos: John Shaw Billings and America's Coming of Age*.

[**The Alan Mason Chesney Medical Archives of the Johns Hopkins Medical Institutions**](#): "The John Shaw Billings Collection consists mostly of historical articles and correspondence about Billings and his role in developing the Johns Hopkins Hospital and School of Medicine. Material by Billings includes one folder of correspondence (1871-1902) and some of Billings' articles on hospital construction and medical education."

[**Milton S. Eisenhower Library of the Johns Hopkins University**](#): contains Billings's correspondence, located in the Daniel Coit Gilman papers.

[**New York Public Library Archives and Manuscripts**](#): contains the John Shaw Billings Papers, 1862-1913, consisting of documents related to Billings's work with the U.S. Army Medical Department, Johns Hopkins Hospital, the 10th and 11th census, New York Public Library and the Carnegie Institute. The collection also contains family correspondence, diaries and scrapbooks related to his experiences in the Civil War.

[**U.S. National Library of Medicine, John Shaw Billings Papers, 1841-1975**](#): consists of "Billings' correspondence during his time as head of the Library of the Surgeon General (1868-1895). Also includes some biographical information, a collection of Billings' reprints, speech texts, scrapbooks, and clippings."



78.1966.1 Birthplace John Shaw Billings M.D.,
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Switzerland County
Marker Text Review Report
08/14/2014

¹ Quotation from *Memorial Meeting in Honor of the Late Dr. John Shaw Billings, April 25, 1913* (New York: The New York Public Library, 1913): 10, accessed [Google Books](#); Thomas Jefferson Griffith, "High Points in the Life of Dr. John Shaw Billings," *Indiana Magazine of History* 30, no.3 (September 1934): 328, accessed [Indiana Magazine of History Online](#), Indiana University ScholarWorks).

Variations of Dr. Welch's quote have been published elsewhere. According to Dr. Thomas Jefferson Griffith, Dr. Welch stated "'probably the most important contribution yet made to American medicine'" ("High Points," 328).

² John Shaw Billings, "An Autobiographical Fragment 1905: A Facsimile Copy of the Original Manuscript (1965)" 1, accessed [Archive.org](#). In his autobiographical fragment, Billings lists "Life in Allensville" as one of his biographical points; "John Shaw Billings," accessed [Find A Grave](#); "1850 United States Federal Census About John S Billings," accessed [Ancestry.com](#).

³ "High Points," 325; According to "High Points," the Billings family lived in New York, Connecticut and Rhode Island before moving back to Allensville, Indiana; Carleton B. Chapman, *Order Out of Chaos: John Shaw Billings and America's Coming of Age* (Boston: The Boston Medical Library, 1994): 10-11; "An Autobiographical Fragment 1905."

⁴ For attending Miami University at Oxford, Ohio, see "Autobiographical Fragment 1905," and "High Points," 325; For his time at the Medical College of Ohio at Cincinnati, see *Order Out of Chaos*, Chapter 3; "High Points," 326.

⁵ "High Points," 326.

⁶ Fielding H. Garrison, *John Shaw Billings: A Memoir* (New York: G.P. Putnam's Sons, The Knickerbocker Press, 1915), 15-16 accessed [Google Books](#). Garrison quotes Billings from an 1888 newspaper article in the *Cincinnati Lancet-Clinic*. Garrison's book is authoritative and contains several facsimiles of Billings's letters and journals. However, its title is misleading, as the book is not a memoir written by Billings himself, but rather a detailed account of his life written by a colleague; A. McGehee Harvey and Susan L. Abrams, "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins," *Maryland Historical Magazine* 84, no.2 (Summer 1989): 121.

⁷ "High Points," 326.

⁸ For his appointment as assistant surgeon, see "The Doctors of America," *Logansport Journal*, October 21, 1888, 2, accessed [Newspaper Archive](#); "High Points," 326; *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6-7, accessed [Google Books](#).

⁹ Quotation from *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6. The meeting refers to the hospital as "Cliffborne." Garrison's *John Shaw Billings: A Memoir* refers to the hospital as "Cliffburne"; J.S. Billings, "Extract from a Narrative of his Services in the Medical Staff," in *The Medical and Surgical History of the War of the Rebellion*, vol. 1, pt. 1 (Washington: Government Printing Office, 1870): 135-136, accessed [Archive.org](#). According to the Extract, Billings treated thousands of soldiers at the West Philadelphia Satterlee Hospital and in March of 1863 he began working with the Army of the Potomac.



78.1966.1 Birthplace John Shaw Billings M.D.,
April 12, 1836- March 11, 1913
Switzerland County
Marker Text Review Report
08/14/2014

¹⁰ "Extract from a Narrative of his Services in the Medical Staff," 135-136; *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6-7.

¹¹ *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6-7.

¹² "High Points," 327; *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6-7; *John Shaw Billings: A Memoir*, 61-62. In a letter to his wife about the Battle of Gettysburg, Billings recalled "I performed a large number of operations of various kinds, received and fed seven hundred and fifty wounded, and worked all that night without cessation."

¹³ *John Shaw Billings: A Memoir*, 64-65.

¹⁴ "High Points." Billings took a brief respite from active duty due to "nervous tension and physical exhaustion," returning to the field March 1864 (327); "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins." Billings later transferred to the Washington, D.C. office of the medical director of the Army of the Potomac, where he edited field reports that became the comprehensive *The Medical and Surgical History of the War* (122).

¹⁵ "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins," 122; "High Points," 327; *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6-7.

¹⁶ *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6-9. According to the *Memorial Meeting*, Civil War hospitals submitted approximately \$85,000 in savings to the Surgeon-General's Office, which was allotted to Billings to cultivate the Office's medical library.

¹⁷ "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins," 125.

"John Shaw Billings, 1838-1913," *The British Medical Journal* 1, no.4031 (April 9, 1938): 796, accessed [JSTOR](#). The article states "his thesis, then, was responsible for those monumental bibliographic achievements, *the Index Catalogue of the Library of the Surgeon-General's Office* and the monthly *Index Medicus*."

¹⁸ *John Shaw Billings: A Memoir*, 15-16. Garrison quotes Billings from an 1888 newspaper article in the *Cincinnati Lancet-Clinic*; "Secretary's Report [Kaaterskill Conference]," *Bulletin of the American Library Association* 7, no. 4, accessed [JSTOR](#). In a few years, Billings established one of the "most celebrated medical libraries in the world," increasing its holdings from 600 entries in 1865 to 50,000 by 1873 (102); For the number of items collected, see "High Points," 328.

"A Brief History of NLM," last modified November 5, 2013, [U.S. National Library of Medicine](#). According to the website, Billings built up the collection by writing to editors, librarians, physicians, and State Department officials asking for donations of books.



78.1966.1 Birthplace John Shaw Billings M.D.,
April 12, 1836- March 11, 1913
Switzerland County
Marker Text Review Report
08/14/2014

¹⁹ J.S. Billings (Bvt. Lt. Col. and Surgeon) to General Joseph K. Barnes (Surgeon-General, U.S. Army), June 1, 1880, in Library of the Surgeon-General's Office, *Index-Catalogue of the Library of the Surgeon-General's Office, United States Army, Authors and Subjects*, series 1, vol. 1 (Washington: Government Printing Office, 1880): iii-v, accessed [U.S. National Library of Medicine, Digital Collections](#); *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*. Volumes "appeared with extraordinary regularity" each year and by 1895 the first series was complete, totaling 1,000 pages (9).

²⁰ Ibid; "Meet to Do Honor to Late Dr. Billings," *New York Times*, April 26, 1913, 8, accessed [Historical Newspapers: The New York Times](#). According to the article, Dr. Osler elaborated that the Index Catalogue was an "exhaustive index of all medical literature, in all its departments and subjects, dealing with all its authors from the most ancient to the most recent times."

"Dr. Billings Selected: Named for Superintendent of the New York Public Library," *New York Times*, January 9, 1896, 9, accessed [ProQuest Historical Newspapers: The New York Times](#). An abundance of sources demonstrate how prolific Billings's Index Catalogue was. The *New York Times* asserts "His great work on which his fame as a bibliographer rests is the 'Index-Catalogue of the Library of the Surgeon General's Office . . . This catalogue is said to be the best and most complete of its kind in the world.'"

²¹ Quotation from Stephen J. Greenberg and Patricia E. Gallagher, "The Great Contribution: *Index Medicus*, *Index-Catalogue*, and *IndexCat*," *J Med Libr Assoc* 97, no. 2 (April 2009): 109, accessed [National Center for Biotechnology Information](#); Greenberg and Gallagher succinctly describe the differences between the Catalogue and *Medicus*, stating that the "*Index Medicus* was the newsletter of the medical publishing world, while the Index-Catalogue was the research guide to a particular medical library that would grow to become the world's largest" (111).

²² "The Great Contribution," 108.

²³ Ibid., 113.

²⁴ *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 11.

²⁵ J.S. Billings, "Report on the Treatment of Diseases and Injuries in the Army of the Potomac during 1864," in *The Medical and Surgical History of the War of the Rebellion*, vol. 1, pt. 1 (Washington: Government Printing Office, 1870): 199, accessed [Archive.org](#); *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 6-7, 11; "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins," 121.

²⁶ *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 11.

²⁷ John S. Billings (Bvt. Lt.-Col. And Asst. Surg., U.S.A.), "Hospital Construction and Organization," in *Hospital Plans: Five Essays Relating to the Construction, Organization & Management of Hospitals, Contributed by their Authors For the Use of the Johns Hopkins Hospital of Baltimore* (New York: William Wood & Co., 1875), accessed [Google Books](#).



78.1966.1 Birthplace John Shaw Billings M.D.,
April 12, 1836- March 11, 1913
Switzerland County
Marker Text Review Report
08/14/2014

Francis T. King (President of Board of Trustees), "Letter Addressed to the Authors of the Essays," in *Hospital Plans: Five Essays Relating to the Construction, Organization & Management of Hospitals, Contributed by their Authors For the Use of the Johns Hopkins Hospital of Baltimore* (New York: William Wood & Co., 1875), accessed [Google Books](#).

"John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins," 127; "High Points," 328.

²⁸ "Hospital Construction and Organization," in *Hospital Plans: Five Essays Relating to the Construction, Organization & Management of Hospitals*. Billings's design emphasized laboratory experimentation, as he hoped to "advance in accurate knowledge of the laws of health and disease." He also emphasized the importance of the hospital to the university, the publication of "original investigations," and raising the standards of medical education, so that a diploma ensured the physician could "learn to think and investigate for himself" (4-10).

²⁹ John S. Billings, "The Plans and Purposes of the Johns Hopkins Hospital: An Address delivered at the opening of the Hospital, May 7, 1889," *The Medical News*, May 11, 1889, 9-10, accessed [Google Books](#). Billings incorporated his visionary ideas into Johns Hopkins Hospital, hoping to produce "investigators as well as practitioners" by having physicians "issue papers and reports giving accounts of advances in, and of new methods of acquiring knowledge, obtained in its wards and laboratories, and that thus all scientific men and all physicians shall share in the benefits of the work actually down within these walls" (17).

³⁰ "The Plans and Purposes of the Johns Hopkins Hospital," 10-12.

³¹ *Memorial Meeting in Honor of the Late Dr. John Shaw Billings*, 11-12; "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins." Harvey and Abrams concluded that "No buildings up to that time had more enlightened arrangements for pure air or more perfect construction of apparatus for heating and ventilation" (128).

³² "John Shaw Billings," *Science* 37, no.953, 512, accessed [Archive.org](#); John S. Billings, M.D. (Director of the Hospital of the University of Pennsylvania) and Henry M. Hurd, M.D. (Superintendent of the Johns Hopkins Hospital), *Suggestions to Hospital and Asylum Visitors* (Philadelphia: J. B. Lippincott Company, 1895): 19, accessed [Google Books](#).

³³ "High Points," 328.

³⁴ John S. Billings, M.D., Address as Chairman of the Section, "The Relations of Hospitals to Public Health," Section 1: General Session in *Hospitals, Dispensaries and Nursing: Papers and Discussions in the International Congress of Charities, Correction and Philanthropy, Section III, Chicago, June 12th to 17th, 1893*, eds. John S. Billings, M.D. and Henry M. Hurd, M.D. (Baltimore: The Johns Hopkins Press, 1894), accessed [Google Books](#). Billings also emphasized the importance of disease prevention in the military, stating "As it is to the interest of a medical officer of the army and navy to prevent, as far as possible, the occurrence of disease among the command to which he is assigned, in order that he may have as little as possible to do in the way of treatment, so it is supposed that these other



78.1966.1 Birthplace John Shaw Billings M.D.,
April 12, 1836- March 11, 1913
Switzerland County
Marker Text Review Report
08/14/2014

medical officials will be active, zealous and efficient agents in prescribing and enforcing state and municipal sanitation" (4).

John Shaw Billings, *A Report on Barracks and Hospitals with Descriptions of Military Posts*, Circular No.4 (Washington: Government Printing Office, 1870), accessed [Google Books](#).

John Shaw Billings, Ed., *A Report on the Hygiene of the United States Army, with Descriptions of Military Posts*, Circular No. 8 (Washington: Government Printing Office, 1870), accessed [Google Books](#).

³⁵ "The Relations of Hospitals to Public Health," in *Hospitals, Dispensaries and Nursing*, 4.

³⁶ Ibid; "The Relations of Hospitals to Public Health," in *Hospitals, Dispensaries and Nursing*. Billings envisioned hospitals as major promoters of public health by "increasing and diffusing knowledge as to the causes, nature and best methods of prevention or treatment of disease" (4).

³⁷ "The Plans and Purposes of the Johns Hopkins Hospital," 7-8; *Suggestions to Hospital and Asylum Visitors*. Billings reminded hospital visitors that "special attention should be given to the presence of dust on ledges or projections of all kinds . . . Dust is a dangerous thing in a hospital" (19).

"Hospital Construction and Organization," in *Hospital Plans: Five Essays Relating to the Construction, Organization & Management of Hospitals*. In his essay to the trustees, Billings said of the spread of fever and disease "by ventilation and through scientific cleanliness this danger may be almost wholly averted, and this is the theory of good hospital management as usually taught" (15).

³⁸ "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins," 120.

³⁹ "An Astronomical Founder," *The* (Washington D.C.) *Evening Star*, May 26, 1894, n.p., accessed [Chronicling America](#); "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins." Harvey and Abrams assert that when Billings retired from the Army in 1895 he was "regarded as the leading authority on public hygiene in the country, and his services and advice were in demand everywhere" (123).

⁴⁰ "John Shaw Billings: Unsung Hero of Medicine at Johns Hopkins." Billings attempted this sanitary reform by conducting and reporting on systematic sanitary surveys of the U.S., including for the yellow fever. Each report represented "pioneer hygienic work, far ahead of its time, undertaken in a day when there were no uniform quarantine regulations in the United States" (123).

⁴¹ John M. Woodworth and John S. Billings, *Cholera Epidemic of 1873 in the United States* (Washington, D.C.: Government Printing Office, 1875), accessed [U.S. National Library of Medicine, Digital Collections](#).

⁴² "John Shaw Billings," *Science*, 512; *Order Out of Chaos*, Chapter 15.



78.1966.1 Birthplace John Shaw Billings M.D.,
April 12, 1836- March 11, 1913
Switzerland County
Marker Text Review Report
08/14/2014

⁴³ Ibid.; *Order Out of Chaos*, 302-316.

⁴⁴ *Order Out of Chaos*, 302-316; "Meet To Do Honor To Late Dr. Billings." According to the article, Andrew Carnegie spoke at a meeting to honor Billings's life at the Stuart Gallery of the New York Public Library, contending "During the long and useful period of his life, he lived with pure, unsullied character, ever above reproach; and by his faithful administration of the great tasks committed to him he left the world better than he found it. I never knew a man of whom I could more safely say that" (8).

⁴⁵ National Library of Medicine, *John Shaw Billings Centennial* (U.S. Department of Health, Education, and Welfare, National Library of Medicine, ca. 1965): [4-5], accessed [U.S. National Library of Medicine](#); *Order Out of Chaos*, 239.

⁴⁶ *John Shaw Billings Centennial*, [5].

⁴⁷ "John Shaw Billings," accessed [Find A Grave](#) ; "New York, New York, Death Index, 1862-1948, John S. Billings," accessed [Ancestry.com](#).

⁴⁸ "Meet To Do Honor To Late Dr. Billings," 8.